

UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION

NETLIST, INC., )  
Plaintiff, )  
vs. ) Civil Action No. 2:22-cv-203-JRG  
MICRON TECHNOLOGY, INC., MICRON ) JURY TRIAL DEMANDED  
SEMICONDUCTOR PRODUCTS, INC., )  
MICRON TECHNOLOGY TEXAS LLC, )  
Defendants. )

**DECLARATION OF DR. WILLIAM MANGIONE-SMITH IN SUPPORT OF  
PLAINTIFF NETLIST, INC.'S OPPOSITION TO DEFENDANTS' MOTION TO  
SEVER AND STAY**

Sworn to this 26th of September 2022 in Kirkland WA.

I declare under penalty of perjury under the laws of the United States of America that the following is true and correct.



Dr. William Mangione-Smith

I, Dr. William Mangione-Smith, declare as follows:

1. I have been asked to provide technological background regarding the asserted patents and products involved in this case as they relate to computer memory modules. I have personal knowledge of the facts stated in this declaration and, if called as a witness, would affirm the truthfulness of each statement herein.

2. In forming my opinions, I have considered and relied upon all documents and information identified in this Declaration. I have also used my education and my years of experience in the field of computer architecture, as well as my understanding of the knowledge, creativity, and experience of a person having ordinary skill in the art in forming my opinions expressed in this Declaration.

**I. Background and Qualifications**

3. My technical background and experience covers most aspects of computer system design, including low-level circuitry, computer architecture, computer networking, graphics, application software, client-server application, Web technology, and system software (e.g., operating systems and compilers). I am a member of the Institute of Electrical and Electronics Engineers and the Association for Computing Machinery, which are the two most significant professional organizations in my profession. I have been employed as a design engineer, research engineer, professor, and technical expert. Over my professional career, I have been an active inventor with 112 issued U.S. patents, 200 published and pending U.S. patent applications and many unpublished U.S. patent applications.

4. From 1984 until 1991 I attended the University of Michigan in Ann Arbor, Michigan, where I was awarded the degrees of Bachelor of Science and Engineering, Master of Science and Engineering, and Doctor of Philosophy. My doctoral research focused on

high-performance computing systems including computer architecture, applications and operating system software, and compiler technology. One of my responsibilities during my graduate studies included teaching senior undergraduate students who were about to enter the profession.

5. After graduating from the University of Michigan I was employed by Motorola in Schaumburg, Illinois. While at Motorola, I was part of a team designing and manufacturing the first commercial battery-powered product capable of delivering Internet email over a wireless (i.e., radio frequency) link and one of the first personal digital assistants. I also served as the lead architect on the second-generation of this device with control over the entire system design including the memory subsystem architecture, embedded processor, ASIC, power system, and analog circuitry. Part of my responsibilities at Motorola involved the specification, design, and testing of system control Application-Specific Integrated Circuits (“ASICs”). I conducted the initial research and advanced design that resulted in the Motorola M\*Core embedded microprocessor. M\*Core was designed to provide the high performance of desktop microprocessors with the low power of contemporaneous embedded processors. The M\*Core received widespread use in many communications products including various cellular handsets, advanced pagers, and embedded infrastructure. While at Motorola I was the sole inventor on one U.S. patent.

6. From 1995 until 2005 I was employed by the University of California at Los Angeles (“UCLA”) as a professor of Electrical Engineering. I was the director of the laboratory for Compiler and Architecture Research in Embedded Systems (“CARES”) and served as the field chair for Embedded Computing Systems. The CARES research team focused on research, engineering and design challenges in the context of battery-powered and multi-media mobile computing devices. One of the key developments of my lab was

the Mediabench software tool, which is widely used to design and evaluate multi-media embedded devices. Key elements of Mediabench include software that is essential for modern digital wireless communications. My primary responsibility, in addition to classroom teaching, involved directing the research and training of graduate students. I was a tenured member of the faculty and had responsibilities for teaching as well as scholarly research. While at UCLA I was a named inventor on three U.S. patent applications, one of which issued as a patent. My colleagues at UCLA were some of the leading scientists and engineers in the world with a long list of innovations from computer network security devices to the nicotine patch. The graduate student researchers in my laboratory came from a diverse set of backgrounds, all with undergraduate degrees in computer engineering, electrical engineering, or computer science, many with multiple years of experience working as professional engineers in areas such as software development, computer system design and ASIC circuit design.

7. From 2005 until 2009, I was employed at Intellectual Ventures in Bellevue, Washington. My responsibilities at Intellectual Ventures included business development, technology assessment, market forecasting, university outreach, collaborative inventing, intellectual property licensing support, and intellectual property asset pricing. My colleagues and co-inventors at Intellectual Ventures included the former lead intellectual property strategist at Intel, Intel's former lead IP council, Microsoft's former chief software architect, the founder of Microsoft research, the designer of the Mach operating system, the architect of the U.S. Defense Department's Strategic Defense Initiative, the founder of Thinking Machines (a seminal parallel processing computer system), and Bill Gates. I had responsibility for hiring and managing over 15 staff members including multiple Ph.Ds. with

degrees in electrical engineering and decades of experience in product design and engineering.

8. A summary of some of my qualifications for forming the opinions in this declaration are as follows: I have more than 30 years of experience as a computer architect, computer system designer, educator, and as an executive in the PC and electronics business. I am also a member of several professional associations, such as the ACM, IEEE and have been intimately involved in professional research through the International Symposium on Microarchitecture (Program Chair for 26th and General Chair for 36th), IEEE Transactions on Computers (Associate Editor), ACM Transactions on Embedded Computing Systems (Associate Editor), and IEEE Computer (Associate Editor). I also have been on the program committees for ISCA, MICRO, ISLPED, Network Processors Workshop, FPL, Complexity-Effective Design, RAW, Workshop on Mediaprocessors, and DSP, FPT, and INTERACT.

9. For further details regarding my employment and academic history, please refer to my curriculum vitae attached as Appendix A to this report.

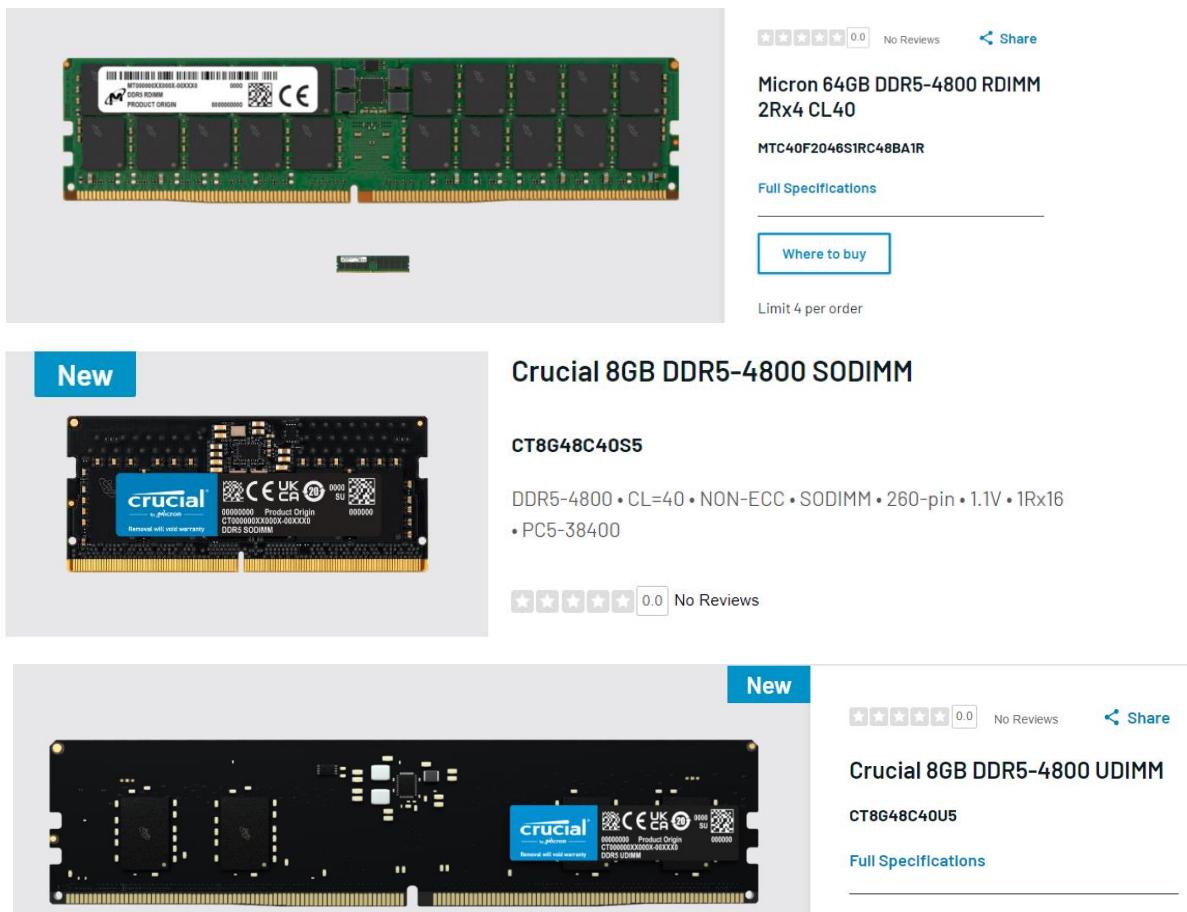
## **II. Background of Memory Module Technology**

10. Memory modules are typically characterized by, among other things, the generation of DRAM on the module (e.g., Double Data Rate 5 (“DDR5”), DDR4, DDR3, etc.) and the format of module (e.g., load-reduced dual in-line memory modules (“LRDIMMs”), registered DIMMs (“RDIMMs”), small-outline DIMMs (“SODIMMs”), unbuffered DIMMs (“UDIMMs”), and Non-Volatile DIMMs (“NVDIMMs”)). Within a given format there are several different chip components, in addition to DRAM, including data buffers and a registering clock driver (“RCD”).

11. I understand that the accused Micron memory products in this case fall into three categories of memory products: (1) High-bandwidth memory; (2) DDR4 LRDIMMs

and (3) DDR5 RDIMMs, LRDIMMs, SODIMMs, and UDIMMs (collectively, “DDR5 DIMMs”). I also understand that in a separate case in the Western District of Texas, Micron has been accused of infringement for its DDR4 NVDIMMs and DDR4 LRDIMMs.

12. DIMMs are a type of memory module which generally include SDRAMs mounted on a printed circuit board with several other components, *e.g.*, SPD, Hub with thermal sensors, and, where applicable, RCD and data buffers. Examples of Micron’s DDR5 RDIMMs, SODIMMs, and UDIMMs are reproduced below, depicting the differences in format between each type of module.<sup>1</sup>

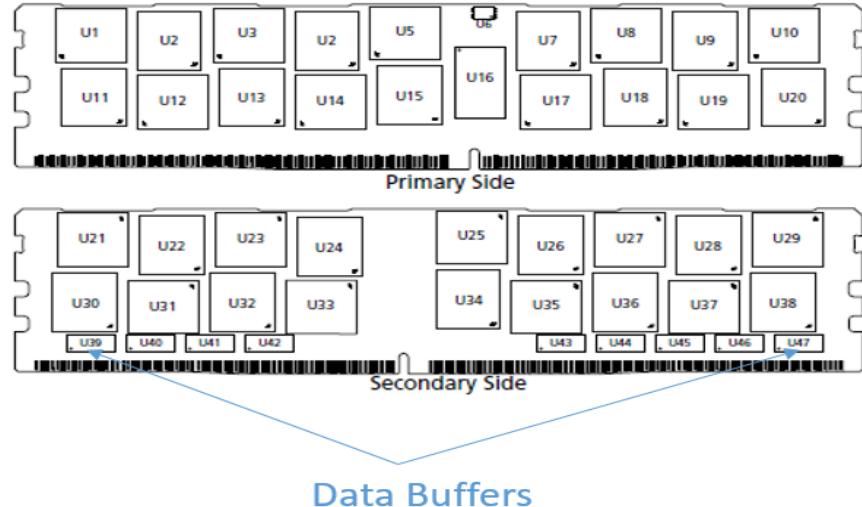


<sup>1</sup> Information of Micron’s accused products can be found at <https://www.micron.com/products> and <https://www.crucial.com/products>.

13. DDR4 LRDIMMs are a type of memory module which generally include DDR4 SDRAMs mounted on a printed circuit board with several other components, an RCD for transmitting control and address signals to the SDRAMs, and data buffers between the host controller and memory devices. As an example, the data sheet of Micron's DDR4 LRDIMMs products describes the features of the products to include "288-pin, command/address/control registered, data buffered, load-reduced . . . LRDIMM."<sup>2</sup>

14. One of the key differences between RDIMMs and LRDIMMs is that LRDIMMs have a distributed set of buffers (labelled "Data Buffer" in the figure below), one buffer for each data line, while RDIMMs have no such data buffering.

**Figure 1: 288-Pin LRDIMM (R/C-B2)**



15. As explained in greater detail below, the power management circuitry for all DIMMs prior to DDR5 is placed on the computer motherboard, rather than on the memory

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<sup>2</sup> Ex. A (Micron MTA144ASQ16G72LSZd datasheet) at 1.

module itself. As Micron notes, placing the power management integrated circuit (a “PMIC”) on the module in DDR5 DIMMs results in “improved efficiency and stability.”<sup>3</sup>

16. There are several key differences between DDR5 memory modules and the older DDR4 memory modules. For example, DDR5 memory modules introduce new features not found in older DDR4 memory designs, including increased memory die density, unique on-module power management solutions, and a new double-channel architecture. DDR5 also operates at far greater speeds than previous generations of DIMMs, with Micron claiming that “DDR5 is the most technologically advanced DRAM to date, enabling the next generation of server workloads by delivering more than an 85% increase in memory performance at the introduction data rate of 4800 MT/s.”<sup>4</sup>

17. A key improvement enabling the above differences is that in DDR5 modules the power management circuitry is located on the module, rather than on the motherboard of the memory system, thus increasing power efficiency. Indeed, as Micron acknowledges, one key benefit of DDR5 modules is the “[o]ptimization of overall system operations with DDR5’s innovative architecture improvements and on-module power management capabilities.”<sup>5</sup>

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<sup>3</sup> Brian Drake, Micron Blog, *Micron’s DDR5 Technology Enablement Program Empowers an Ecosystem*, <https://www.micron.com/about/blog/2021/june/microns-ddr5-technology-enablement-program-empowers-an-ecosystem>.

<sup>4</sup> *Id.*

<sup>5</sup> Micron Press Release, *Micron DDR5 Server Dram Available to Data Center Customers in Advance of Next-Generation Server Platforms*, <https://investors.micron.com/news-releases/news-release-details/micron-ddr5-server-dram-available-data-center-customers-advance>.

#### **A. Patents Discussed in this Declaration**

18. I have been asked to comment on whether there is substantial technical overlap between the patents at issue in this action (EDTX I Patents)<sup>6</sup> and the patents in Netlist's lawsuits against Micron in the Western District of Texas (WDTX Patents).<sup>7</sup>

19. I have reviewed the patents in this action as well as the four that were originally asserted in WDTX. Certain information regarding each patent is summarized below.<sup>8</sup> I note that in addition to their differences in patented features, the '339 patent (at issue in EDTX) and the '314 patent (at issue in WDTX) have different priority dates that do not overlap with the remaining EDTX I Patents or WDTX Patents.

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<sup>6</sup> Patent Nos. 10,860,506 (the “‘506 patent”); 10,949,339 (the “‘339 patent”); 11,016,918 (the “‘918 patent”); 11,232,054 (the “‘054 patent”)(collectively the “EDTX I Patents”).

<sup>7</sup> Patent Nos. 8,301,833 (the “‘833 patent”); 9,824,035 (the “‘035 patent”); 10,268,608 (the “‘608 patent”); and 10,489,314 (the “‘314 patent”) (collectively “WDTX Patents”).

<sup>8</sup> I understand that the parties do not dispute that the '060 and the '160 patents have no relationship or overlap with the WDTX Patents. Therefore, they are not discussed in this Declaration.

Patent(s)	Priority Application(s)	Priority Date	Relevant Technology
<b>WDTX Patents</b>			
8,301,833	Provisional No. 60/941,586	June 1, 2007	clock frequencies for different operating modes in an NVDIMM system
9,824,035 10,268,608	Provisional No. 61/676,883	July 27, 2012	'035: controlling timing of the respective data and strobe signals on the data paths for transmitting respective data and strobe signals associated with a memory operation '608: delaying a data signal through a data path that corresponds to a data signal line
10,489,314	Provisional Nos. 60/645,087; 60/588,244; 60/550,668; 60/575,595; and 60/590,038	Jan. 19, 2005; July 15, 2004; Mar. 5, 2004; May 28, 2004; July 21, 2004	regulating the timing of data bursts and data strobe signals sent from a controller to the memory module “at a specified data rate” in response to a command from the host
<b>Relevant EDTX Patents</b>			
10,860,506	Provisional No. 61/676,883	July 27, 2012	delaying, by a data buffer, a read data strobe signal (used for validating data signals) and using, by data buffer, the delayed read data strobes to sample data passing through the data buffer
10,949,339	U.S. App. No. 12/504,131	July 16, 2009	use of tristate buffers to enable/disable the data paths in the data buffers on an LRDIMM
11,016,918; 11,232,054	Provisional No. 60/941,586	June 1, 2007	on-module voltage regulation for providing regulated voltages to components on a memory module (applicable to DDR5 DIMMs)

**B. There Is No Substantial Overlap Between the Relevant Features of the PMIC Family (the '918 and '054 Patents) and the WDTX Patents**

20. The '918 and '054 patents are directed to the use of a novel on-module power management system. I therefore refer to them as the PMIC patents.

21. Netlist has asserted the '918 and '054 patents only against Micron's DDR5 DIMMs. The PMIC patents focus on technology for the on-module power management circuitry implemented on Micron's DDR5 memory modules in the form of a power management integrated circuit. As noted above, on-module power management is a feature that is new to DDR5; DDR4 DIMMs do not employ an on-board PMIC, but instead rely on power management functions on the motherboard. *See supra ¶¶ 15-17.* Thus, there is no overlap between the accused features at issue in the infringement allegations for the PMIC patents and any of the four patents originally raised in the Western District of Texas ("WDTX Patents"), which do not implicate on-module power management.

22. The WDTX Patents do not implicate power management or voltage regulation. This set includes U.S. Patent No. 8,301,833 (the "'833 patent"), which is from the same family and claims priority to the same provisional application as the PMIC patents. However, the claims of the '833 patent are directed at an entirely different invention requiring different clock frequencies depending on the mode of operation, which would concern data and control signal exchange, not the on-module power management system claimed in the PMIC patents.

23. Additionally, a person of ordinary skill in the art would not view all DIMMs as being substantially similar. DDR4 memory modules and DDR5 memory modules are substantially different, especially when it comes to power management. As noted above, DDR5 introduces significant advantages over DDR4 memory modules. *Supra, ¶¶ 15-17.* Indeed, the standards specifying the structure and operation of DDR4 and DDR5 memory modules were developed many years apart. Saying all DIMMs are substantially similar regardless of the generation of DRAM on the module (e.g., DDR4 versus DDR5), or the format of the DIMM (e.g., LRDIMM versus RDIMM, SODIMM, or UDIMM) is like saying

2G and 5G telecommunication services are substantially similar in all aspects because they are both cellular networks. There is only a superficial degree of overlap, which is not relevant across the patent groupings.

**C. The '339 Patent and WDTX Patents are Directed to Different Aspects of DDR4 DIMM Technology**

24. As shown above, the '339 patent does not belong to the same patent family as any of the WDTX Patents. *See supra* ¶ 19. Further, the '339 patent is directed to different aspects of DDR4 technology than the WDTX Patents.

25. The claims of the '339 patent cover the use of tristate buffers to enable or disable the data paths in the data buffers on an LRDIMM. Independent claims 11, 19, and 27 recite the use of “n/2 data transmission circuits” “a plurality of buffers,” and “a plurality of n-bit-wise data buffers” with similar limitations as claim 1.

26. Netlist’s Complaint asserts that key features disclosed by the '339 patent are practiced by DDR4 data buffers compliant with certain standards developed by JEDEC. For example, Netlist relies on the implementation of certain circuitry on the data buffer as illustrated in JESD 82-32A:

In each of the accused DDR4 LRDIMMs, the each respective byte-wise buffer further includes logic configurable to control the byte-wise data path in response to the module control signals and the byte-wise data path includes first tristate buffers, and the logic in response to the module control signals is configured to enable the first tristate buffers, *e.g.*, via the MDQ\_OE signal associated with a particular TX for a particular MDQ bit, to drive the respective byte-wise section of the N-bit wide write data to the respective module data lines during the first time period. For example:

4.61 Logic Diagram

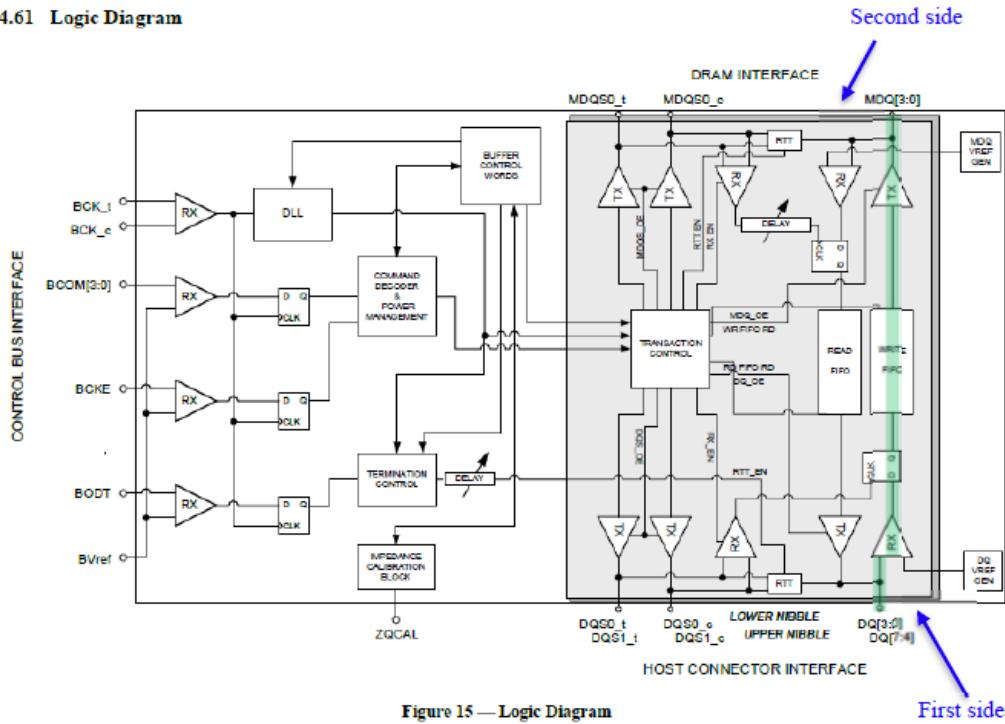


Figure 15 — Logic Diagram

Ex. 18 (JESD82-32A Standard), at 95 (showing an example of a byte-wise data path (upper nibble and lower nibble), highlighted in green, between the first side at DQ and the second side at MDQ).

Dkt. 4, ¶ 87.

27. By contrast, the WDTX '035, '608, and '314 patents do not claim byte-wise buffers that include logic configured to control the timed enabled or disabled data path(s) through each of the data buffer circuits. The '314 patent relates separately to regulating the timing of data bursts and data strobe signals sent from a controller to the memory module “at a specified data rate” in response to a command from the host. *See, e.g., '314, cl. 1.* The '035 and '608 patent claims recite the use of on-buffer logic or circuitry to control the timing of data and data signals on the data paths in the data buffer, not when data paths through the data buffers are to be enabled or disabled. *See, e.g., '035, 19:29-45; '608, 19:36-55.*

**D. The Distributed Buffer Patents and WDTX Patents are Directed to Distinct Advances in DDR4 DIMM Technology**

28. As for the '506 at issue in the EDTX Action, it is also directed to different aspects of DDR4 technology than '035 and '608 patents in the WDTX Actions. For example, claim 1 of the '506 patent specifically requires "a first memory device" to output read data and a "first read strobe signal" associated with a read operation, and a first data buffer configurable to delay, by a predetermined amount, a "first read strobe signal." '506, 19:35-37, 19:44-48. A "strobe" signal is a non-data signal that is used to validate another signal, *e.g.*, a data signal. *See Ex. B (Jacob)* at 318 ("A 'strobe' is a signal that indicates to the recipient that another signal, *e.g.*, data or command, is present and valid."). Claim 1 of the '506 patent further requires that the claimed first data buffer be configurable to, in response to one or more "module control signals" associated with the memory read operation, "sample" a first section of read data using the "first delayed read strobe," and "transmit the first section of the read data to a first section of the data bus." '506, 19:44-52. The method of independent claim 14 recites similar limitations as claim 1. *See id.*, 21:62-22:10. The '608 and '035 patents do not have such requirements.

29. In contrast, the '608 patent is generally directed to delaying a data signal through a data path that corresponds to a data signal line. For example, claim 1 of the '608 patent specifically requires a plurality of "buffer circuits" that are coupled between a respective set of "data/strobe signal lines" and memory devices on the module, where each respective "buffer circuit" includes "a delay circuit configured to delay a signal through [a] data path" "corresponding to each **data** signal line in the respective set of data/strobe signal lines." '608, 19:36-45, 19:52-55 (emphasis added). Read strobe signals, the subject matter of the '506 patent, are not transmitted on data signal lines; instead, they are transmitted on separate strobe signal lines.

30. The '035 patent also differs from the '506 patent in key ways. The '035 patent generally relates to controlling timing of the respective data and strobe signals on the data paths for transmitting respective data and strobe signals associated with a memory operation. For example, claim 1 of the '035 patent requires a plurality of “buffer circuits,” where each respective “buffer circuit” includes “data paths for transmitting respective data and strobe signals associated with the first memory operation,” and “logic configured to respond to the module control signals by *enabling* the data paths.” '035 patent, 19:29-39. In contrast to the '506 patent, the '035 patent does not require that the data buffer be configurable to generate a “first delayed read strobe,” much less use the “first delayed read strobe” to “sample” a first section of read data associated with a memory read operation. '506, 19:44-52.”). Thus, by contrast to the '035 patent, in the '506 patent, the delayed strobes are used internally by the data buffer and are not further transmitted to a host. That is, the '506 and '035 involve different strobe signals.

31. These distinctions are not trivial, and require explaining very different concepts to the jury.

### **III. Conclusion**

32. Given the differences in technologies, it is my opinion that different parts of the design files, RTL code, and source code will need to be reviewed for the PMIC patents and EDTX Patents on the one hand and the WDTX Patents on the other hand. To the extent that incremental value analyses are to be conducted for damages, the improvements will also need to be evaluated against different baselines given the drastic difference in technical areas. I do not see substantial overlap in the technical analysis for the EDTX Patents and the WDTX Patents.

# Appendix A

**William Henry Mangione-Smith**  
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**(425) 654-1424**  
**[billms@gmail.com](mailto:billms@gmail.com)**

## Highlights

Reviewed and valued thousands of patents.  
Priced over \$500M worth in patent portfolios.  
Key technical support for licensing that has raised more than \$1B.  
Significant experience developing claim charts and evidence of use.  
Former tenured professor at the University of California.  
Deposition and trial testifying experience.

## Education

BSE (1987), MSE (1992), & Ph.D. University of Michigan  
Doctoral Thesis 1992: Performance Bounds and Buffer Space Requirements for Concurrent Processors

## Employment

2009-Present	Sole Proprietor of Phase Two LLC – Consulting and intellectual property services All IP related work since 2009 has been conducted under the auspices of Phase Two
2012 May-June	CTO Computers and Consumer Electronics at IP Navigation Group
2005-2008	Intellectual Ventures, Bellevue Washington
2005	Patent valuation, licensing support, focus on computer patents
2006	Head of all IV valuation efforts – managed a team of 12
2007	Director of technology, outbound licensing in consumer electronics
2008	Director of investment strategy, inventor relations
2001-2005	Associate Professor, EE UCLA
1995-2001	Assistant Professor, EE UCLA Focus low power embedded multimedia communications systems
1993-1995	Motorola Wireless Data Group Systems architect for General Magic wireless PDA

1991-1992	Motorola Corporate Research Parallel computer performance monitoring Low power processor architecture
1986-1987	Chrysler Corporation Software Architect

## Patents

- 9,760,588 - Cross-media storage coordination
- 9,747,426 - Handling masquerading elements
- 9,716,548 - Data center with free-space optical communications
- 9,692,887 - Component information and auxiliary information related to information ...
- 9,683,884 - Selective audio/sound aspects
- 9,680,699 - Evaluation systems and methods for coordinating software agents
- 9,659,188 - Obfuscating identity of a source entity affiliated with a communique ...
- 9,641,537 - Conditionally releasing a communique determined to be affiliated with a ...
- 9,583,141 - Implementing audio substitution options in media works
- 9,513,157 - Selective audio/sound aspects
- 9,479,535 - Transmitting aggregated information arising from appnet information
- 9,455,035 - Management of memory refresh power consumption
- 9,426,387 - Image anonymization
- 9,374,242 - Using evaluations of tentative message content
- 9,372,536 - Touch screen with tactile feedback
- 9,367,833 - Data services outsourcing verification
- 9,306,975 - Transmitting aggregated information arising from appnet information
- 9,274,582 - Power consumption management
- 9,230,601 - Media markup system for content alteration in derivative works
- 9,219,815 - Identifier technique for communication interchange
- 9,215,512 - Implementation of media content alteration
- 9,191,341 - Packet routing within an on-chip network
- 9,178,911 - Evaluation systems and methods for coordinating software agents
- 9,158,771 - Component information and auxiliary information related to information ...
- 9,152,928 - Context parameters and identifiers for communication
- 9,092,928 - Implementing group content substitution in media works
- 9,065,979 - Promotional placement in media works
- 9,008,117 - Cross-media storage coordination
- 9,008,116 - Cross-media communication coordination
- 8,984,579 - Evaluation systems and methods for coordinating software agents
- 8,984,133 - Providing treatment-indicative feedback dependent on putative ...
- 8,966,630 - Generating and distributing a malware countermeasure
- 8,949,337 - Generation and establishment of identifiers for communication

8,943,267 - Management of memory refresh power consumption  
8,929,208 - Conditionally releasing a communique determined to be affiliated ...  
8,924,975 - Core selection for applications running on multiprocessor systems ...  
8,913,753 - Selective audio/sound aspects  
8,910,033 - Implementing group content substitution in media works  
8,886,577 - Feedback during surgical events  
8,850,044 - Obfuscating identity of a source entity affiliated with a communique in ...  
8,839,255 - Scheduling of threads by batch scheduling  
8,819,686 - Scheduling threads on different processor cores based on ...  
8,818,196 - Data center with free-space optical communications  
8,799,912 - Application selection of memory request scheduling  
8,774,637 - Data center with free-space optical communications  
8,732,087 - Authorization for media content alteration  
8,730,836 - Conditionally intercepting data indicating one or more aspects ...  
8,712,250 - Data center with free-space optical communications  
8,682,982 - Preliminary destination-dependent evaluation of message content  
8,655,187 - Data center with free-space optical communications  
8,640,248 - Handling masquerading elements  
8,640,247 - Receiving an indication of a security breach of a protected set of files  
8,627,402 - Evaluation systems and methods for coordinating software agents  
8,626,848 - Obfuscating identity of a source entity affiliated with a communique ...  
8,626,731 - Component information and auxiliary information related to ...  
8,613,095 - Smart distribution of a malware countermeasure  
8,607,336 - Evaluation systems and methods for coordinating software agents  
8,607,234 - Batch scheduling with thread segregation and per thread type marking ...  
8,601,530 - Evaluation systems and methods for coordinating software agents  
8,601,207 - Management of memory refresh power consumption  
8,601,104 - Using network access port linkages for data structure update decisions  
8,588,618 - Data center with free-space optical communications  
8,583,553 - Conditionally obfuscating one or more secret entities with respect to ...  
8,559,307 - Routing packets in on-chip networks  
8,555,396 - Authenticatable displayed content  
8,549,077 - Usage parameters for communication content  
8,539,581 - Efficient distribution of a malware countermeasure  
8,516,300 - Multi-voltage synchronous systems  
8,483,569 - Data center with free-space optical communications  
8,281,036 - Using network access port linkages for data structure update decisions  
8,255,745 - Hardware-error tolerant computing  
8,243,045 - Touch-sensitive display device and method  
8,224,930 - Signaling partial service configuration changes in appnets  
8,224,907 - System and method for transmitting illusory identification characteristics  
8,214,191 - Cross-architecture execution optimization  
8,209,755 - Signaling a security breach of a protected set of files

8,209,524 - Cross-architecture optimization  
8,203,609 - Anonymization pursuant to a broadcasted policy  
8,191,140 - Indicating a security breach of a protected set of files  
8,161,232 - Periodically and empirically determined memory refresh intervals  
8,126,938 - Group content substitution in media works  
8,126,190 - Targeted obfuscation of an image  
8,117,654 - Implementation of malware countermeasures in a network device  
8,082,225 - Using destination-dependent criteria to guide data transmission decisions  
8,065,404 - Layering destination-dependent content handling guidance  
8,055,797 - Transmitting aggregated information arising from appnet information  
8,055,732 - Signaling partial service configuration changes in appnets  
8,055,648 - Managing information related to communication  
7,972,557 - Plasmon filter  
7,930,389 - Adaptive filtering of annotated messages or the like  
7,877,584 - Predictive processor resource management  
7,860,887 - Cross-media storage coordination  
7,752,255 - Configuring software agent security remotely  
7,739,524 - Power consumption management  
7,653,834 - Power sparing synchronous apparatus  
7,607,042 - Adjusting a processor operating parameter based on a performance criterion  
7,519,995 - Programmable hardware for deep packet filtering  
7,512,842 - Multi-voltage synchronous systems  
7,493,516 - Hardware-error tolerant computing  
5,793,991 - Method of equalizing loads on a computer bus

## **Patent Applications**

Dr. Mangione-Smith has no known financial interest in any pending US patent applications other than some applications where he is listed as an inventor. The list of such published patent applications where he is a named inventor can be found by searching the online USPTO database or directly accessed via this link:

<http://goo.gl/Uq2q7Q>.

## **Expert Consultant in IP Matters – Multi-Year Engagements Noted Once**

2022

ITC 337-TA-1318

Advanced Micro Devices, Inc. and ATI Technologies and TCL et. Al  
Engaged by Mintz Levin on behalf of AMD

NETLIST, INC, vs. SAMSUNG ELECTRONICS CO., LTD.  
Eastern District of Texas, Marshall Division

Civil Action No. 2:21-CV-463-JRG

Engaged on behalf of Netlist, counsel is with Irell & Manella LLP

WSOU Investments, LLC d/b/a Brazos Licensing and Development v. ZTE

CIVIL ACTION 6:20-CV-00487-ADA

CIVIL ACTION 6:20-CV-00488-ADA

CIVIL ACTION 6:20-CV-00489-ADA

CIVIL ACTION 6:20-CV-00490-ADA

CIVIL ACTION 6:20-CV-00491-ADA

CIVIL ACTION 6:20-CV-00492-ADA

CIVIL ACTION 6:20-CV-00493-ADA

CIVIL ACTION 6:20-CV-00494-ADA

CIVIL ACTION 6:20-CV-00495-ADA

CIVIL ACTION 6:20-CV-00496-ADA

CIVIL ACTION 6:20-CV-00497-ADA

Engaged by Kasowitz Benson Torres LLP on behalf of WSOU Investments

WSOU Investments, LLC d/b/a Brazos Licensing and Development v. Google LLC

CIVIL ACTION 6:20-CV-00571-ADA

CIVIL ACTION 6:20-CV-00572-ADA

CIVIL ACTION 6:20-CV-00573-ADA

CIVIL ACTION 6:20-CV-00575-ADA

CIVIL ACTION 6:20-CV-00576-ADA

CIVIL ACTION 6:20-CV-00579-ADA

CIVIL ACTION 6:20-CV-00580-ADA

CIVIL ACTION 6:20-CV-00583-ADA

CIVIL ACTION 6:20-CV-00584-ADA

CIVIL ACTION 6:20-CV-00585-ADA

Engaged by Folio Law Group on behalf of WSOU

Highlands Advisory

IP evaluation

Interdigital

IP evaluation

KONINKLIJKE KPN N.V., v. XIAOMI CORPORATION et al, and COOLPAD TECHNOLOGIES INC.,

The District of Delaware

C.A. No. 21-cv-41-LPS-CJB and C.A. No. 21-cv-43-LPS-CJB

Engaged on behalf of KPN

Counsel is Sussman & Godfrey

Provided declaration.

2021

WSOU Investments, LLC d/b/a Brazos Licensing and Development v. Microsoft Corp.,  
Case No. 6:12-cv-463 (W.D.T.X.)

Engaged by Susman Godfrey on behalf of WSOU Investments  
Provided testimony via declaration

KONINKLIJKE KPN N.V., vs. TELEFONAKTIEBOLAGET LM ERICSSON AND ERICSSON INC.

Case 2:21-cv-113 in the Eastern District of Texas  
Engaged by Susman Godfrey LLP on behalf of Koninklijke KPN  
Testified via declaration and deposition.

Barkan Wireless IP Holdings, L.P. v. T-Mobile US, Inc., T-Mobile USA, Inc., and Nokia of America Corp., No. 2:21-cv-00034-JRG (E.D. Tex.)

Engaged on behalf of Barkan by Heim, Payne & Chorush, LLP  
Technology relates to communications equipment.  
Provided testimony via declaration and deposition.

Intel Corporation v. FG SRC LLC et al.  
Engaged on behalf of FG SRC LLC, by DiMuroGinsberg PC  
IPR case number IPR2020-01449  
Technology relates to reconfigurable computing  
Provided testimony via declaration and deposition.

StratosAudio, Inc. v. multiple automotive manufacturers  
Engaged on behalf of StratosAudio, Inc by White & Case LLP  
Technology relates to accounting for content distribution

2020

Netlist vs. S. K. Hynix  
Nos. 6:20-cv-00194-ADA and 6:20-cv-00525-ADA (W.D. Tex.)  
Engaged on behalf of Netlist, provided testimony on behalf of Netlist  
Technology relates to memory modules

INTEL CORPORATION, Petitioner v. PACT XPP SCHWEIZ AG  
Before the Patent Trial and Appeal Board of the US Patent and Trademark Office  
Working with Quinn Emanuel Urquhart & Sullivan on behalf of PACT XPP

Digital Video-Capable Devices and Components Thereof, USITC 337-TA-1224  
Working with Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C

On behalf of Koninklijke Philips N.V. and Philips North America LLC  
Provided sworn testimony

UNILOC 2017, LLC et al. v. GOOGLE LLC  
Northern District of California  
4:20-cv-04355-YGR  
Prince Lobel Tye LLP  
Working on behalf of Uniloc

UNILOC 2017, LLC et al. v. GOOGLE LLC  
Working with Ethridge Law Group and Carter Arnett on behalf of Uniloc  
Eastern District of Texas, Marshall Division  
Case No. 2-18-cv-00492-JRG-RSP, filed 2018-11-17  
Case No. 2-18-cv-00496-JRG-RSP, 2018-11-17  
Case No. 2-18-cv-00499-JRG-RSP, 2018-11-17  
Patent consulting thus far, testimony anticipated  
INTEL CORPORATION, v. VLSI TECHNOLOGY LLC  
IPR2019-01197, Patent 6,212,633  
Working with LOWENSTEIN & WEATHERWAX LLP on behalf of VLSI  
Provided expert testimony in the form of a declaration and deposition.

Consulting work for Global Foundries related to computer chips.

GPU++, LLC v. Qualcomm Incorporated, et al.,  
Working with Steptoe & Johnson on behalf of GPU++  
Texas Western District, case 6:19-cv-00474-ADA, filed 2019-08-16  
Testimony provided.  
Technology relates to graphics processing systems

VLSI Technology v. Intel  
Western District of Texas, case 6:19-CV-256  
Working with Irell & Manella LLP on behalf of VLSI Technology LLC  
Provided testimony in the form of expert reports and depositions.

## 2019

VLSI Technology LLC v. Intel  
District of Delaware, case 1:18-cv-00966  
Working with Irell & Manella LLP on behalf of VLSI Technology LLC  
Technology relates to semiconductor manufacturing  
Patent consulting thus, testimony anticipated

Consulting work for DivX – related to computer video.

2018

INVT SPE LLC v. Apple Inc., HTC Corp. and HTC America, Inc. ZTE Corp. and ZTE (USA) Inc.

Certain LTE- and 3G-Compliant Cellular Communications Devices, Investigation No. 337-TA-1138

Provided Expert Testimony on behalf of INVT  
Technology relates to wireless communications

Mahltig Management- und Beteiligungsgesellschaft mbH in patent proceedings relating to European Patent 1 714 229

Adverse to Intel and Lenovo

Technology relates to microprocessors

Netlist vs. S. K. hynix

US ITC 337-TA-1089

Engaged on behalf of Netlist, provided testimony on behalf of Netlist  
Technology relates to memory modules

Voip-Pal.com Inc.

Technology relates to VOIP service providers

Voip-Pal.com, Inc. v. Amazon.com, Inc. et al - 2:18-cv-01076

Voip-Pal.com, Inc. v. Apple, Inc. - 2:16-CV-00260

Voip-Pal.com, Inc. v. Apple, Inc. - 2:18-cv-00953

Voip-Pal.com Inc. v. Verizon and AT&T - 2:16-CV-00271

Voip-Pla.com, Inc. v. Twitter - 2:16-CV-02338

2017

AMD v. LG, Vizio, MediaTek and Sigma Designs

US ITC 337-TA-1044

Provided Expert Testimony on behalf of AMD

Technology relates to graphics processing hardware

Netlist vs. S. K. hynix

US ITC 337-TA-1023

Engaged on behalf of Netlist

Provided Expert Testimony via Report, Deposition and at hearing

Technology relates to memory modules

Advanced Micro Devices Inc.

Engaged on behalf of AMD

USPTO Re-Exam Defense

Provided testimony via expert report and interview  
Technology relates to microprocessors

Advanced Micro Devices Inc.  
Engaged on behalf of AMD  
IPR Defense  
Provided testimony via expert report for IPR2015-00321  
IPR2015-00328 and IPR2015-00321  
Technology relates to microprocessors

2016

INTEL CORPORATION v. FUTURE LINK SYSTEMS, LLC - C.A. No. 14-377-LPS  
Retained by Irell and Manella LLP on behalf of Future Link Systems, LLC  
Technology relates to computer communications systems  
Declarations filed on behalf of Future Link Systems, LLC

Voip-Pal.com Inc.  
Technology relates to VOIP service providers  
Retained to assist during an IPR action  
IPR2016-01198 and IPR2016-01201

TiVo Inc. v. Samsung Electronics Co., Ltd., et al., Case No. 2:15-cv-1503 (E.D. Tex.)  
Technology relates to digital video recorders  
Retained by Irell and Manella LLP on behalf of TiVo Inc.

Rosetta-Wireless Corporation Inter Partes Reviews Nos. IPR2016-00616 and  
IPR2016-00622  
Technology relates to personal communications and computing devices. Retained  
by Heim, Payne and Chorush on behalf of Rosetta-Wireless Declaration filed.

Innovative Memory Solutions, Inc. (IMS) v. Micron Technology  
District of Delaware - 14-cv-01480-RGA  
Engaged by IMS via Cohen & Grace, LLC  
Technology relates to semiconductor memory manufacturing

Zak v. Facebook  
Eastern District of Michigan - 4:15-cv-13437  
Engaged by Zak via Harness, Dickey & Pierce PLC  
Technology relates to client-server software Declaration  
filed.

2015

Advanced Silicon Technologies, LLC Delaware District Court and at the ITC (No matter number assigned)

Technology relates to programmable processor hardware Accused parties:

Texas Instruments Incorporated 1:15-cv-01175

NVIDIA Corporation 1:15-cv-01177

Renesas Electronics Corporation et al. 1:15-cv-01176

Fujitsu Ten Limited et al. 1:15-cv-01174

Bayerische Motoren Werke AG et al. 1:15-cv-01178

VOLKSWAGEN AG 1:15-cv-01181

Harmon International Industries Incorporated et al. 1:15-cv-01173

Honda Motor Co., Ltd. et al. 1:15-cv-01179

Toyota Motor Corporation 1:15-cv-01180

FlatWorld Interactives LLC v. Samsung and LG

C.A. No. 12-804-LPS and C.A. No. 12-964-LPS

Engaged on behalf of FlatWorld

Technology relates to user interface design

Ericsson Inc. vs. Apple Inc.

EDTX 2:15-cv-290 and 2:15-cv-292

Engaged on behalf of Ericsson

Technology relates to peripheral devices

Synaptics vs. Goodix

US ITC 337-TA-957

Engaged on behalf of Goodix

Provided Expert Testimony via Report, Deposition and at hearing

Technology relates to touch screens

Advanced Micro Devices Inc.

Engaged on behalf of AMD

IPR Defense

Provided testimony via expert report

Technology relates to digital video

IPR2015-00328 and IPR2015-00321

Solocron Media LLC v. Verizon Communications, Inc., Cellco Partnership d/b/a/ Verizon Wireless, AT&T Mobility LLC, T-Mobile USA, Inc., and Sprint Spectrum L.P.

The Eastern District of TX, Case 2:13-cv-1059-JRG

Retained by tensegrity on behalf of Solocron

Technology relates to MMS and multi-media transcoding.

Prepared expert reports on infringement.

Enterprise Systems Technologies S.a.r.l v. Apple Inc., Cirrus Logic Inc., HTC Corporation, LG Electronics, Inc., Samsung Electronics Co  
The International Trade Commission of the United States of America  
Inv. No. 337-TA-924  
Retained by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo LLP for complainant.  
Technology relates to device drivers. Prepared  
expert reports and deposed.

Ziilabs Inc., LTD., v. Samsung and Apple  
Case 2:14-cv-00203 In the Eastern District of Texas Marshall Division  
Retained by Davis of Heim, Payne & Chorush, L.L.P. for Ziilabs Technology  
relates to graphics systems.  
Provided expert report on infringement as well as deposition testimony.

Packet Intelligence LLC v. Cisco  
Case 2:2014cv00252 In the Eastern District of Texas Marshall Division  
Retained by Heim, Payne & Chorush, L.L.P. for Packet Intelligence Technology  
relates to secure networking.

Advanced Micro Devices, Inc. v. LG Corp., et al.  
5:14-cv-01012 U.S. District Court for the Northern District of California Retained  
by Robins, Kaplan, Miller & Ciresi LLP on behalf of Advanced Micro Devices,  
Inc.  
Technology relates to microprocessors and multimedia.

dunnhumby USA, LLC, et al. v. emnos USA Corp.  
U.S. District Court for the Northern District of Illinois  
Case No.: 1:13-cv-00399  
Retained by Baker Hostetler who represents dunnhumby Technology  
relates to databases.

Parthenon Unified Memory Architecture LLC, v. HTC CORPORATION and HTC  
AMERICA, INC., LG ELECTRONICS, INC. and LG ELECTRONICS USA, INC.  
Case No. 2:14-cv-690-JRG-RSP  
Case No. 2:14-cv-691-JRG-RSP  
Eastern District of Texas, Marshall Division Technology  
relates to multimedia systems.  
Retained on behalf of Parthenon

Parthenon Unified Memory Architecture LLC, v. SAMSUNG ELECTRONICS CO.,  
LTD., ET AL. HUAWEI TECHNOLOGIES CO. LTD, HUAWEI TECHNOLOGIES

USA, INC. and HUAWEI DEVICE USA, INC. and MOTOROLA MOBILITY LLC

Case No. 2:14-cv-902-RSP

Case No. 2:14-cv-687-JRG-RSP

Case No. 2:14-cv-689-JRG-RSP

Eastern District of Texas, Marshall Division Technology  
relates to multimedia systems.

Retained on behalf of Parthenon

NEXUS DISPLAY TECHNOLOGIES LLC, Plaintiff, v. DELL INC., LENOVO  
(UNITED STATES) INC., PANASONIC CORP. OF NORTH AMERICA, EIZO CORP.  
AND

EIZO INC., NEC CORP. AND NEC DISPLAY SOLUTIONS OF AMERICA, INC.

Civil Action No: 2:14-cv-00762

Civil Action No: 2:14-cv-00762

Civil Action No. 2:14-cv-00763

Civil Action No. 2:14-cv-00764

Civil Action No. 2:14-cv-00765

Technology relates to communications circuits.

Retained on behalf of Nexus Display Technologies

INTEL CORPORATION, v. FUTURE LINK SYSTEMS, LLC

C.A. No. 1:14-CV-00377-LPS

District Court for Delaware

Technology relates to communications circuits.

Retained on behalf of Future Link Systems

2014

Content Guard v. Apple Inc., Amazon.com Inc., BlackBerry Corporation, Huawei Device USA, Inc., Motorola Mobility LLC, BlackBerry Limited, HTC Corporation, HTC America, Inc., Huawei Technologies Co., Ltd., Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung Telecommunications America, LLC

The Eastern District of TX, case 2:13-cv-01112-JRG

Retained by McKool Smith on behalf of Content Guard

Technology relates to digital right management.

Content Guard v. Google Inc.

The Eastern District of TX, Case 2:14-cv-00061-JRG Retained  
by McKool Smith on behalf of Content Guard Technology  
relates to digital right management.

Solocron Media LLC v. Verizon Communications, Inc., Cellco Partnership d/b/a/  
Verizon Wireless, AT&T Mobility LLC, T-Mobile USA, Inc., and Sprint Spectrum L.P.

The Eastern District of TX, Case 2:13-cv-1059-JRG  
Retained by tensegrity on behalf of Solocron  
Technology relates to MMS and multi-media transcoding.

Enterprise Systems Technologies S.a.r.l v. Apple Inc., Cirrus Logic Inc., HTC Corporation, LG Electronics, Inc., Samsung Electronics Co  
The International Trade Commission of the United States of America  
Inv. No. 337-TA-924  
Retained by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo LLP for complainant.  
Technology relates to device drivers.

Ziilabs Inc., LTD., v. Samsung and Apple  
Case 2:14-cv-00203 In the Eastern District of Texas Marshall Division  
Retained by Davis of Heim, Payne & Chorush, L.L.P. for Ziilabs Technology  
relates to graphics systems.

Packet Intelligence LLC v. Cisco  
Case 2:2014cv00252 In the Eastern District of Texas Marshall Division  
Retained by Heim, Payne & Chorush, L.L.P. for Packet Intelligence Technology  
relates to secure networking.

Rockstar Consortium US v. Asustek, Google, HTC, LGE, Pantech, Samsung and ZTE  
2:13-cv-00899 In the Eastern District of Texas Marshall Division  
Retained by McKool Smith for Rockstar  
Technology relates to user interfaces and messaging.

Advanced Micro Devices, Inc. v. LG Corp., et al.  
5:14-cv-01012 U.S. District Court for the Northern District of California Retained  
by Robins, Kaplan, Miller & Ciresi LLP on behalf of Advanced Micro Devices,  
Inc.  
Technology relates to microprocessors and multimedia.

Pragmatus Mobile LLC v. Samsung Electronics Co. Ltd, etc.  
U.S. ITC Inv. No. 337-TA-905  
Retained by Flagship IP. P.C. on behalf of Complainant Pragmatus Mobile LLC  
Technology relates to converged devices.

CallCopy Inc.  
Assistance with Reexamination efforts related to Verint Americas Inc.  
Retained by Baker Hostetler  
Technology related to call systems and call center management. Submitted  
declarations with the USPTO.

dunnhumby USA, LLC, et al. v. emnos USA Corp.  
U.S. District Court for the Northern District of Illinois  
Case No.: 1:13-cv-00399  
Retained by Baker Hostetler who represents dunnhumby Technology  
relates to database technology.

Graphics Properties Holdings, v. Panasonic et al.  
ITC Inv. No. 337-TA-884  
Retained by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo LLP for complainant.  
Provided testimony through expert reports, deposition and at trial. Technology  
relates to graphics hardware.

2013

Graphics Properties Holdings, v. Panasonic et al.  
ITC Inv. No. 337-TA-884  
Retained by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo LLP for complainant.  
Provided testimony through expert reports and deposition. Technology  
relates to graphics hardware.

CallCopy Inc.  
Assistance with Reexamination efforts related to Verint Americas Inc.  
Retained by Hahn Loeser & Parks LLP  
Technology related to call systems and call center management. Submitted  
declarations with the USPTO.

dunnhumby USA, LLC, et al. v. emnos USA Corp.  
U.S. District Court for the Northern District of Illinois  
Case No.: 1:13-cv-00399  
Retained by Baker Hostetler who represents dunnhumby Technology  
relates to database technology.

Microlinc, LLC v. INTEL CORPORATION, ACER, INC., ACER AMERICA  
CORPORATION, ADVANCED MICRO DEVICES, INC., APPLE, INC., DELL, INC.,  
GATEWAY, INC., HEWLETT-PACKARD COMPANY, LENOVO GROUP, LTD,  
LENOVO (UNITED STATES), INC., NVIDIA CORPORATION, SONY COMPUTER  
ENTERTAINMENT AMERICA INC., TOSHIBA CORPORATION, TOSHIBA  
AMERICA INC., and TOSHIBA AMERICA INFORMATION SYSTEMS, INC.  
Eastern District of Texas  
Retained by Eugene M. Cummings, P.C.  
Submitted reports regarding infringement, invalidity and claim construction along with  
numerous declarations. Appeared at the Markman hearing. Deposed. Technology  
relates to microprocessor communications.

FlashPoint Technology, Inc. v. HTC Corporation, HTC America, Inc., Pantech Co., Ltd., Pantech Wireless, Inc., Huawei Technologies Co., Ltd., FutureWei Technologies, Inc. d/b/a Huawei Technologies (USA), ZTE Corporation, ZTE (USA) Inc., USA International Trade Commission

Certain Electronic Imaging Devices, Inv. No. 337-TA-850

Expert for FlashPoint, who is represented by Pepper Hamilton, LLP.

Submitted reports numerous declarations. Testified at the ITC. Deposed. Technology relates to converged devices.

2012

FlashPoint Technology, Inc. v. HTC Corporation, HTC America, Inc., Pantech Co., Ltd., Pantech Wireless, Inc., Huawei Technologies Co., Ltd., FutureWei Technologies, Inc. d/b/a Huawei Technologies (USA), ZTE Corporation, ZTE (USA) Inc., USA International Trade Commission

Certain Electronic Imaging Devices, Inv. No. 337-TA-850

Expert for FlashPoint, who is represented by Pepper Hamilton, LLP.

Submitted reports numerous declarations. Testified at the ITC. Deposed. Technology relates to converged devices.

*Graphics Properties Holdings v. HTC et. al.*

*Graphics Properties Holdings v. LG Electronics et. al.*

*Graphics Properties Holdings v. Sony et. al.*

*Graphics Properties Holdings v. Samsung Electronics et. al.*

*Graphics Properties Holdings v. Apple*

*Graphics Properties Holdings v. Research In Motion et. al.*

United States District Court for the District of Delaware

Testifying expert witness for GPH on matters related to invalidity.

Pepper Hamilton LLP and Mintz, Levin, Cohn, Ferris, Glovsky and Popeo LLP represent plaintiffs.

Subject matter relates to graphics systems and CPU microarchitecture. Submitted reports numerous declarations. Deposed.

IPValue

Non-litigation related patent evaluation services.

*TV Interactive Data Corporation v. Sony Corporation, Sony Computer Entertainment Inc, Sony Computer Entertainment America Inc, Sony Corporation of America, Sony Electronics Inc, Samsung Electronics Co Ltd, Samsung Electronics America Inc, Royal Philips Electronics NV, Philips Electronics North America Corporation, Toshiba Corporation, Toshiba America Inc., Toshiba America Consumer Products LLC, Panasonic Corporation, Panasonic Corporation of North America, Victor Company of Japan, LTD, JVC Americas Corp, LG Electronics Inc, LG Electronics USA Inc., Zenith*

*Electronics LLC, Pioneer Corporation, Pioneer Electronics (USA) Inc., Sharp Corporation, Sharp Electronics Corporation, Funai Electric Co., Ltd., Funai Corporation, Inc., D&M Holdings Inc., D&M Holdings US Inc. and Denon Electronics (USA), LLC*

United States District Court for the Northern District of California Case 5:2010cv00475

Consultant for defendant Funai

Defendants Funai Electric Co. Ltd. and Funai Corporation, Inc. are represented by Kevin W. Kirsch, David A. Mancino, John F. Bennett, Matthew P. Hayden, and Hayes F. Michel of Baker Hostetler

Subject matter relates to DVDs and computer Operating Systems.

*Interval Licensing LLC, v. AOL, Inc.; Apple, Inc.; eBay, Inc.; Facebook, Inc.; Netflix, Inc.; Office depot, Inc.; Officemax, Inc.; Staples, Inc.; Yahoo! Inc.; and Youtube, LLC.*

United States District Court for the Western District of Washington Case 2:10-cv-01385

Consultant for Interval Licensing LLC

Technology relates to user interfaces and data organization.

Interval Licensing LLC is represented by Michael F. Heim, Eric J. Enger, and Nathan J. Davis of Heim, Payne & Chorush, L.L.P.

Subject matter relates to online search, advertising and data presentation.

Submitted declarations related to claim construction. Deposed. Technology relates to user interfaces and data organization.

*St. Clair Intellectual Property Consultants, Inc. v. Acer, Inc., Acer America Corporation, Dell Inc., Gateway Companies, Inc., Gateway, Inc., Lenovo Group, Limited and Lenovo (United States) Inc.*

United States District Court for the District of Delaware - 1:2009cv00354

Consultant for St. Clair Intellectual Property Consultants

St. Clair is represented by R. Terrance Rader, Charles W. Bradley, Glenn E. Forbis, and Justin S. Cohen of Rader Fishman & Grauer PLLC

Subject matter relates to power management and graphics hardware.

Filed reports regarding validity and infringement and provided deposition testimony.

*ST. CLAIR INTELLECTUAL PROPERTY CONSULTANTS, INC., v. APPLE, INC. HIGH TECH COMPUTER CORP., a/k/a HTC CORP., HTC (B.V.I.), HTC AMERICA, INC., EXEDEA, INC., RESEARCH IN MOTION LTD., and RESEARCH IN MOTION CORPORATION*

United States District Court for the District of Delaware - 1:10-cv-00982-LPS

Consultant for St. Clair Intellectual Property Consultants

St. Clair is represented by R. Terrance Rader, Charles W. Bradley, Glenn E. Forbis, and Justin S. Cohen of Rader Fishman & Grauer PLLC Filed a declaration.

Subject matter relates to cameras and messaging.

Red Chalk Group  
Subject matter relates to patent analysis.

Siemens  
Subject matter relates to patent analysis.

Phoenix Technologies  
Subject matter relates to patent analysis.

## 2011

*TV Interactive Data Corporation v. Sony Corporation, Sony Computer Entertainment Inc, Sony Computer Entertainment America Inc, Sony Corporation of America, Sony Electronics Inc, Samsung Electronics Co Ltd, Samsung Electronics America Inc, Royal Philips Electronics NV, Philips Electronics North America Corporation, Toshiba Corporation, Toshiba America Inc., Toshiba America Consumer Products LLC, Panasonic Corporation, Panasonic Corporation of North America, Victor Company of Japan, LTD, JVC Americas Corp, LG Electronics Inc, LG Electronics USA Inc., Zenith Electronics LLC, Pioneer Corporation, Pioneer Electronics (USA) Inc., Sharp Corporation, Sharp Electronics Corporation, Funai Electric Co., Ltd., Funai Corporation, Inc., D&M Holdings Inc., D&M Holdings US Inc. and Denon Electronics (USA), LLC*

United States District Court for the Northern District of California

Case 5:2010cv00475

Consultant for defendant Funai

Defendants Funai Electric Co. Ltd. and Funai Corporation, Inc. are represented by Kevin W. Kirsch, David A. Mancino, John F. Bennett, Matthew P. Hayden, and Hayes F. Michel of Baker Hostetler

Subject matter relates to DVDs and computer Operating Systems.

*Interval Licensing LLC, v. AOL, Inc.; Apple, Inc.; eBay, Inc.; Facebook, Inc.; Netflix, Inc.; Office depot, Inc.; Officemax, Inc.; Staples, Inc.; Yahoo! Inc.; and Youtube, LLC.*  
United States District Court for the Western District of Washington Case 2:10-cv-01385  
Consultant for Interval Licensing LLC

Interval Licensing LLC is represented by Michael F. Heim, Eric J. Enger, and Nathan J. Davis of Heim, Payne & Chorush, L.L.P.

Subject matter relates to online search, advertising and data presentation.

*St. Clair Intellectual Property Consultants, Inc. v. Acer, Inc., Acer America Corporation, Dell Inc., Gateway Companies, Inc., Gateway, Inc., Lenovo Group, Limited and Lenovo (United States) Inc.*

United States District Court for the District of Delaware - 1:2009cv00354  
Consultant for St. Clair Intellectual Property Consultants

St. Clair is represented by R. Terrance Rader, Charles W. Bradley, Glenn E. Forbis, and Justin S. Cohen of Rader Fishman & Grauer PLLC Technology relates to power management.

*ST. CLAIR INTELLECTUAL PROPERTY CONSULTANTS, INC., v. APPLE, INC. HIGH TECH COMPUTER CORP., a/k/a HTC CORP., HTC (B.V.I.), HTC AMERICA, INC., EXEDEA, INC., RESEARCH IN MOTION LTD., and RESEARCH IN MOTION CORPORATION*

United States District Court for the District of Delaware - 1:10-cv-00982-LPS  
Consultant for St. Clair Intellectual Property Consultants  
St. Clair is represented by R. Terrance Rader, Charles W. Bradley, Glenn E. Forbis, and Justin S. Cohen of Rader Fishman & Grauer PLLC Filed a declaration.  
Subject matter relates to power management and graphics hardware.

*Negotiated Data Solutions*

Consultant for Negotiated Data Solutions  
Negotiated Data Solutions is represented by Susman, Godfrey LLP. Subject matter relates to IO devices.

*Acqis LLC*

Declarations filed with USPTO in response to a series of reexamination requests.  
Deposed in a related case (Texas Eastern District Court 6:2009cv00148) as a consequence of declarations.  
Acqis LLC is represented by Cooley, Godward, Kronish LLP Subject matter relates to computer systems.

*FlashPoint Technology, Inc. v. Nokia Corp. of Finland, Nokia, Inc. of Irving, Texas, Research In Motion Ltd. of Canada, Research In Motion Corp. of Irving, Texas, HTC Corp. of Taiwan, HTC America, Inc. of Bellevue, Washington, LG Electronics of South Korea, LG Electronics U.S.A., Inc. of Englewood Cliffs, New Jersey, and LG Electronics MobileComm U.S.A., Inc. of San Diego, California*

US ITC Inv. No. 337-TA-726

Consultant for FlashPoint Technology, Inc.

FlashPoint Technology Inc. is represented by William D. Belanger, Gregory D. Len, and Frank Liu of Pepper Hamilton LLP.

Filed reports regarding validity and infringement and provided testimony both via deposition and in court.

Subject matter relates to camera systems.

*MicroUnity, Inc. v. Texas Instruments Inc., Qualcomm, Inc., Samsung Electronics Co LTD, Motorola, Inc., Nokia Corporation, Palm, Inc., Samsung TeleCommunications America, LLC, Acer, Inc., HTC Corporation, Google Inc., LG Electronics Inc, Apple, Inc., Cellco Partnership d/b/a Verizon Wireless, Sprint Nextel Corporation and AT&T*

2:2010cv00091

Consultant for MicroUnity, Inc.

Eastern District of Texas

MicroUnity, Inc., is represented by Heim, Payne, and Chorush LLP. Subject matter relates to graphics hardware and microarchitecture.

2010

*TV Interactive Data Corporation v. Sony Corporation, Sony Computer Entertainment Inc, Sony Computer Entertainment America Inc, Sony Corporation of America, Sony Electronics Inc, Samsung Electronics Co Ltd, Samsung Electronics America Inc, Royal Philips Electronics NV, Philips Electronics North America Corporation, Toshiba Corporation, Toshiba America Inc., Toshiba America Consumer Products LLC, Panasonic Corporation, Panasonic Corporation of North America, Victor Company of Japan, LTD, JVC Americas Corp, LG Electronics Inc, LG Electronics USA Inc., Zenith Electronics LLC, Pioneer Corporation, Pioneer Electronics (USA) Inc., Sharp Corporation, Sharp Electronics Corporation, Funai Electric Co., Ltd., Funai Corporation, Inc., D&M Holdings Inc., D&M Holdings US Inc. and Denon Electronics (USA), LLC*

United States District Court for the Northern District of California

Case 5:2010cv00475

Consultant for defendant Funai

Defendants Funai Electric Co. Ltd. and Funai Corporation, Inc. are represented by Kevin W. Kirsch, David A. Mancino, John F. Bennett, Matthew P. Hayden, and Hayes F. Michel of Baker Hostetler

Subject matter relates to DVDs and computer Operating Systems.

*Interval Licensing LLC, v. AOL, Inc.; Apple, Inc.; eBay, Inc.; Facebook, Inc.; Netflix, Inc.; Office depot, Inc.; Officemax, Inc.; Staples, Inc.; Yahoo! Inc.; and Youtube, LLC.*  
United States District Court for the Western District of Washington Case 2:10-cv-01385  
Consultant for Interval Licensing LLC

Interval Licensing LLC is represented by Michael F. Heim, Eric J. Enger, and Nathan J. Davis of Heim, Payne & Chorush, L.L.P.

Subject matter relates to online search, advertising and data presentation.

*St. Clair Intellectual Property Consultants, Inc. v. Acer, Inc., Acer America Corporation, Dell Inc., Gateway Companies, Inc., Gateway, Inc., Lenovo Group, Limited and Lenovo (United States) Inc.*

United States District Court for the District of Delaware - 1:2009cv00354

Consultant for St. Clair Intellectual Property Consultants

St. Clair is represented by R. Terrance Rader, Charles W. Bradley, Glenn E. Forbis, and Justin S. Cohen of Rader Fishman & Grauer PLLC

Subject matter relates to power management and graphics hardware.

*Negotiated Data Solutions*

Consultant for Negotiated Data Solutions

Negotiated Data Solutions is represented by Susman, Godfrey LLP. Subject matter relates to IO devices.

*Acqis LLC*

Declarations filed with USPTO in response to a series of reexamination requests. Deposed in a related case (Texas Eastern District Court 6:2009cv00148) as a consequence of declarations.

Acqis LLC is represented by Cooley, Godward, Kronish LLP Subject matter relates to computer systems.

*FlashPoint Technology, Inc. v. Nokia Corp. of Finland, Nokia, Inc. of Irving, Texas, Research In Motion Ltd. of Canada, Research In Motion Corp. of Irving, Texas, HTC Corp. of Taiwan, HTC America, Inc. of Bellevue, Washington, LG Electronics of South Korea, LG Electronics U.S.A., Inc. of Englewood Cliffs, New Jersey, and LG Electronics MobileComm U.S.A., Inc. of San Diego, California*

US ITC Inv. No. 337-TA-726

Consultant for FlashPoint Technology, Inc.

FlashPoint Technology Inc. is represented by William D. Belanger, Gregory D. Len, and Frank Liu of Pepper Hamilton LLP.

Subject matter relates to camera systems.

Filed reports regarding validity and infringement and provided testimony both via deposition and in court.

*MicroUnity, Inc. v. Texas Instruments Inc., Qualcomm, Inc., Samsung Electronics Co LTD, Motorola, Inc., Nokia Corporation, Palm, Inc., Samsung TeleCommunications America, LLC, Acer, Inc., HTC Corporation, Google Inc., LG Electronics Inc, Apple, Inc., Celco Partnership d/b/a Verizon Wireless, Sprint Nextel Corporation and AT&T*  
2:2010cv00091

Consultant for MicroUnity, Inc.

Eastern District of Texas

MicroUnity, Inc., is represented by Heim, Payne, and Chorush LLP. Subject matter relates to graphics hardware and microarchitecture.

*Saxon Innovations, LLC v. Apple, Inc., Gateway, Inc., Gateway Companies, Inc., Acer America Corp., Acer, Inc., Hewlett-Packard Co. and Dell, Inc*

Eastern District of Texas 6:2008cv00265

Consultant for Saxon Innovations, LLC

Representing Saxon Innovations, LLC, who was represented by Heim, Payne, and Chorush LLP.

Subject matter relates to multiprocessors systems and computer systems. Filed reports regarding validity and infringement and provided testimony both via deposition and in court.

*Joel M. Geddis and Shaun Legacy v. Microsoft Corporation, Toshiba Corporation, Freescale Semiconductor, Inc., Wolfson Microelectronics, Inc., Wolfson Microelectronics PLC*

Superior Court of Washington in and for King County 08-2-40731-4 SEA  
Consultant for Toshiba Corporation

Toshiba Corporation is represented by Forsberg & Umlauf, P.S. Subject matter relates to portable audio devices.

2009

*Saxon Innovations, LLC v. LG Electronics Inc., LG Electronics USA Inc., LG Electronics Mobilecomm U.S.A., Inc., Samsung Electronics Co. Ltd, Samsung Electronics America Inc., Samsung Telecommunications America LLC, Palm Incorporated, Research in Motion Ltd, Research In Motion Corporation, Nintendo Co. Ltd, and Nintendo of America*

Eastern District of Texas 6:07-CV-490

Prepared expert report regarding invalidity on behalf of Saxon Innovations, LLC. Saxon Innovations, LLC, was represented by Pepper Hamilton LLP.

Subject matter relates to multiprocessors systems and computer systems. Filed reports regarding validity and infringement and provided testimony both via deposition and in court.

*Saxon Innovations, LLC, v. Nokia Corp., Research In Motion Ltd., High Tech Computer Corp., Palm, Inc., Panasonic Corporation, US*

ITC 337-TA-667

Expert witness for Saxon Innovations, LLC.

Submitted reports, was deposed, and testified at trial regarding claim construction and invalidity.

Saxon Innovations, LLC was represented by William D. Belanger, Aaron J. Levangie, Gregory D. Len, and Charles H. Carpenter of Pepper Hamilton LLP.

Subject matter relates to multiprocessors systems and computer systems.

*Advanced Micro Devices, Inc. v. Samsung Electronics Co, Ltd.*

U.S. District Court for the Northern District of California 3:08-cv-00986-SI Consultant for Advanced Micro Devices, Inc. Reverse engineering efforts to support infringement contentions.

Advanced Micro Devices, Inc is represented by Robins, Kaplan, Miller and Ciresi LLP. Subject matter relates to memory devices.

Intellectual Ventures

Subject matter relates to patent analysis.

2005

*Speedera Networks, Inc., v. Akamai Technologies, Inc.*

U.S. District Court for the Northern District of California 5:02-cv-03050-JW Consultant for Speedera Networks, Inc.

Reviewed depositions and provided review of computer security.

Speedera Networks, Inc. was represented by Jim Bowman of O'Melveny & Myers LLP. Technology related to computer security.

*Research in Motion Limited et al. v. Inpro II Licensing SARL*

U.S. District Court for the Northern District of Texas 3:03-cv-02669-B Consultant for InPro II Licensing SARL . Provided patent analysis.

InPro II Licensing SARL was represented by Dechert. Technology related to IO devices.

*Digi International, Inc. v. Lantronix, Inc.*, 0:04-cv-01560-DWF-SRN U.S.

District Court for the District of Minnesota

Consultant for Lantronix, Inc. Prepared expert reports.

Lantronix, Inc. was represented by Stradling Yocca Carlson & Rauth. Technology related to IO devices.

2004

*Intergraph Hardware Technologies Company, Inc v. Hewlett-Packard*

U.S. District Court for the Eastern District of Texas Company 6:04-cv-00214-LED

Expert for Intergraph Hardware Technologies Company, Inc. Prepared expert reports and claim charts.

Intergraph represented by McDermott, Will and Emery LLP. Technology related to computer communications.

*Mentor Graphics*

Provided licensing support and IP valuation.

Technology related to emulation.

*Veterinary Imaging Centers, Inc. v. Sound Technologies, Inc., et al.*, 1:02-cv-00282-DCN

U.S. District Court for the Northern District of Ohio

Consultant for Sound Technologies, Inc. Prepared expert reports. Technology related to computer communication.

*Interealty Corp. v. Superaltive, Inc., et al.*, 8:01-cv-00969-AHS-AN

U.S. District Court for the Central District of California

Consultant for Superlative, Inc. Matter involved software copyright. Prepared expert reports and was deposed.

Superlative, Inc. was represented by Edward F. O'Connor with the law firm of Levin & O'Connor.

Technology related to databases.

*All Computers, Inc. v. Intel Corporation*, 1:04-cv-00586-GBL-LO

U.S. District Court for the Eastern District of Virginia

Consultant for All Computers, Inc. Filed numerous expert reports. Deposed by Ruffin Cordell of Fish & Richardson.

Plaintiff was represented by Edward F. O'Connor with the law firm of Levin & O'Connor.

Technology related to microprocessors.

## 2001

Ikos Systems, Inc. v. Axis Systems, Inc., 5:01-cv-21079-JW

U.S. District Court for the Northern District of California

Filed numerous expert reports. Deposed by Ikos Counsel. Presented tutorial to Judge Ware. Deposed.

Axis Systems, Inc. was represented by George Riley of O'Melveny and Myers

Technology related to emulation.

## **Professional Activities**

Member of ACM and IEEE

Program Chair 26'th International Symposium on Microarchitecture

General Chair 36'th International Symposium on Microarchitecture

Associate Editor of IEEE Transactions on Computers

Associate Editor of ACM Transactions on Embedded Computing Systems

Associate Editor of IEEE Computer

*Program Committees*: ISCA, MICRO, ISLPED, Network Processors Workshop, FPL,

Complexity-Effective Design, RAW, Workshop on Mediaprocessors and DSP, FPT,

INTERACT

## **Publications**

### **Journal**

1. W. H. Mangione-Smith, T.-P. Shih, S. G. Abraham, and E. S. Davidson, "Approaching a Machine-Application Bound in Delivered Performance on Scientific Codes," *Proceedings of the IEEE*, vol. 81, pp. 1166-1178, 1993.

2. C. Chien, S. Nazareth, P. Lettieri, S. Molloy, B. Schoner, W. A. I. Boring, J. Chen, C. Deng, W. H. Mangione-Smith, and R. Jain, "An Integrated Testbed for Wireless Multimedia Computing," *Journal of VLSI Signal Processing*, vol. 13, pp. 105-24, 1996.
3. K.-G. Chia, H. J. Kim, S. Lansing, W. H. Mangione-Smith, and J. Villasenor, "High Performance Automatic Target Recognition through Data-Specific VLSI," *IEEE Transactions on VLSI*, vol. 6, pp. 364-372, 1998.
4. N. R. Shnidman, W. H. Mangione-Smith, and M. Potkonjak, "On-line Fault Detection for Bus-Based Field Programmable Gate Arrays," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 6, pp. 656-66, 1998.
5. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Low Overhead Fault-Tolerant FPGA Systems," *IEEE Transactions on Very Large Scale Integration*, pp. 212-21, 1998.
6. D. Kirovski, C. Lee, M. Potkonjak, and W. H. Mangione-Smith, "Application-Driven Synthesis of Memory-Intensive Systems-on-Chip," *IEEE Transactions on ComputerAided Design of Integrated Circuits and Systems*, vol. 18, pp. 1316-1326, 1999.
7. W. H. Mangione-Smith, "Technical Challenges for Designing Personal Digital Assistants," *Design Automation for Embedded Systems*, vol. 4, pp. 23-39, 1999.
8. D. Kirovski, J. Kin, and W. H. Mangione-Smith, "Procedure Based Program Compression," *International Journal of Parallel Programming*, vol. 27, pp. 457-475, 1999.
9. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Enhanced FPGA Reliability through Efficient Run-Time Fault Reconfiguration," *IEEE Transactions on Reliability*, vol. 49, pp. 296-304, 2000.
10. B. Kahng, J. Lach, W. H. Mangione-Smith, S. Mantik, I. L. Markov, M. Potkonjak, P. Tucker, H. Wang, and G. Wolfe, "Constraint-based Watermarking Techniques for Design IP Protection," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 20, pp. 1236-52, 2001.
11. Jach, W. H. Mangione-Smith, and M. Potkonjak, "Fingerprinting Techniques for FieldProgrammable Gate Array Intellectual Property Protection," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 20, pp. 1253-61, 2001.
12. C. Lee, J. Kin, M. Potkonjak, and W. H. Mangione-Smith, "Exploring Hypermedia Processor Design Space," *Journal of VLSI Signal Processing Systems for Signal, Image, and Video Technology*, vol. 27, pp. 171-186, 2001.
13. J. Kin, C. Lee, W. H. Mangione-Smith, and M. Potkonjak, "Exploring the Diversity of Multimedia Systems," *IEEE Transactions on VLSI Systems*, vol. 9, pp. 474-485, 2001.
14. J. Kin, M. Gupta, and W. H. Mangione-Smith, "Filtering Memory References to Increase Energy Efficiency," *IEEE Transactions on Computers*, vol. 49, pp. 1-15, 2002.
15. G. Memik and W. H. Mangione-Smith, "Precise Instruction Scheduling", *To Appear in the Journal of Instruction-Level Parallelism*, 2005.

1. T. Conte and W. Mangione-Smith, "Determining Cost-Effective Multiple Issue Processor Designs," presented at International Conference on Computer Design, 1993.
2. W. H. Mangione-Smith, S. G. Abraham, and E. S. Davidson, "The Effects of Memory Latency and Fine-Grain Parallelism on Astronautics ZS-1 Performance," presented at Twenty-Third Hawaii International Conference on System Sciences, 1990.
3. W. H. Mangione-Smith, S. G. Abraham, and E. S. Davidson, "Architectural vs. Delivered Performance of the IBM RS/6000 and the Astronautics ZS-1," presented at Twenty-Fourth Hawaii International Conference on System Sciences, 1991.
4. W. H. Mangione-Smith, S. G. Abraham, and E. S. Davidson, "Vector Register Design for Polycyclic Vector Scheduling," presented at Fourth Conference on Architectural Support for Programming Languages and Operating Systems, 1991.
5. W. Mangione-Smith, S. G. Abraham, and E. S. Davidson, "Register Requirements of Pipelined Processors," presented at International Conference on Supercomputing, 1992.
6. W. H. Mangione-Smith and B. Hutchings, "Configurable Computing: The Road Ahead," presented at Reconfigurable Architectures Workshop, Geneva, 1997.
7. J. Kin, C. Lee, W. H. Mangione-Smith, and M. Potkonjak, "Hypermedia Processors: Design Space Exploration," presented at Multi-Media Signal Processing Conference, 1998.
8. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Fingerprinting Digital Circuits on Programmable Hardware," presented at Second International Workshop on Information Hiding, 1998.
9. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Signature Hiding Techniques for FPGA Intellectual Property Protection," presented at IEEE/ACM International Conference on Computer-Aided Design, 1998.
10. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "FPGA Fingerprinting Techniques for Protecting Intellectual Property," presented at Custom Integrated Circuits Conference, 1998.
11. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Efficiently Supporting FaultTolerance in FPGAs," presented at International Symposium on Field Programmable Gate Arrays, 1998.
12. W. Mangione-Smith, "Configurable Computing: Concepts and Issues," presented at Thirtieth Hawaii International Conference on System Sciences, 1997.
13. J. Villasenor, B. Schoner, C. Kang-Ngee, C. Zapata, K. Hea Joung, C. Jones, S. Lansing, and B. Mangione-Smith, "Configurable Computing Solutions for Automatic Target Recognition," presented at FPGAs for Custom Computing Machines, 1996.
14. B. Mangione-Smith, "Low Power Communications Protocols: Paging and Beyond," presented at IEEE Symposium on Low Power Electronics, 1995.
15. H. J. Kim, W. H. Mangione-Smith, and M. Potkonjak, "Protecting Ownership Rights of a Lossless Image Coder through Hierarchical Watermarking," presented at IEEE Workshop on Signal Processing Systems, 1998.
16. B. Kahng, J. Lach, W. H. Mangione-Smith, S. Mantik, I. L. Markov, M. Potkonjak, P. Tucker, H. Wang, and G. Wolfe, "Watermarking Techniques for Intellectual Property Protection," presented at Design and Automation Conference, 1998.

17. Rashid, J. Leonard, and W. H. Mangione-Smith, "Dynamic Circuit Generation for Solving Specific Problem Instances of Boolean Satisfiability," presented at FPGAs for Custom Computing Machines, 1998.
18. D. Kirovski, C. Lee, M. Potkonjak, and W. Mangione-Smith, "Synthesis of Power Efficient Systems-on-Silicon," presented at Asia and South Pacific Design Automation Conference, 1998.
19. J. Leonard and W. H. Mangione-Smith, "A Case Study of Partially Evaluated Hardware Circuits: Key-Specific DES," presented at Field-Programmable Logic and Applications, 1997.
20. N. R. Shnidman, W. H. Mangione-Smith, and M. Potkonjak, "Fault Scanner for Reconfigurable Logic," presented at Advanced Research in VLSI, 1997.
21. J. Kin, M. Gupta, and W. H. Mangione-Smith, "The Filter Cache: an Energy Efficient Memory Structure," presented at International Symposium on Microarchitecture, 1997.
22. D. Kirovski, J. Kin, and W. H. Mangione-Smith, "Procedure Based Program Compression," presented at International Symposium on Microarchitecture, 1997.
23. D. Kirovski, C. Lee, M. Potkonjak, and W. H. Mangione-Smith, "Application-Driven Synthesis of Core-Based Systems," presented at International Conference on Computer Aided Design, 1997.
24. Mangione-Smith, P. S. Ghang, S. Nazareth, P. Lettieri, W. Boring, and R. Jain, "A Low Power Architecture for Wireless Multimedia Systems: Lessons Learned from Building a Power Hog," presented at International Symposium on Low Power Electronics and Design, 1996.
25. Lee, J. Kin, M. Potkonjak, and W. H. Mangione-Smith, "Media Architecture: General Purpose vs. Multiple Application-Specific Programmable Processor," presented at Design Automation Conference, 1998.
26. Lee, M. Potkonjak, and W. H. Mangione-Smith, "MediaBench: a Tool for Evaluating and Synthesizing Multimedia and Communications Systems," presented at International Symposium on Microarchitecture, 1997.
27. Rashid, J. Asher, W. H. Mangione-Smith, and M. Potkonjak, "Hierarchical Watermarking for Protection of DSP Filter Cores," presented at IEEE 1999 Custom Integrated Circuits Conference, San Diego, CA USA, 1999.
28. H. Zou, H. J. Kim, S. Kim, B. Daneshrad, R. Wesel, and W. H. Mangione-Smith, "Equalized GMSK, Equalized QPSK, and COFDM, a Comparative Study for High Speed Wireless Indoor Data Communications," presented at International Vehicular Technology Conference, Houston, TX USA, 1999.
29. J. Kin, C. Lee, W. H. Mangione-Smith, and M. Potkonjak, "Power Efficient Mediaprocessors: Design Space Exploration," presented at Design Automation Conference, New Orleans, LA USA, 1999.
30. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Robust FPGA Intellectual Property Protection through Multiple Small Watermarks," presented at Design Automation Conference, 1999.
31. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Efficient Error Detection, Localization and Correction for FPGA-based Debugging," presented at Design Automation Conference, 2000.

32. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Algorithms for Efficient Runtime Fault Recovery on Diverse FPGA Architectures," presented at IEEE International Symposium on Defect and Fault Tolerance in VLSI Systems, 1999.
33. Lee, J. Kin, M. Potkonjak, and W. Mangione-Smith, "Designing Power Efficient Hypermedia Processors," presented at International Symposium on Low Power Electronics and Design, 1999.
34. J. Lach, W. H. Mangione-Smith, and W. Potkonjak, "Enhanced Intellectual Property Protection for Digital Circuits on Programmable Hardware," presented at International Workshop on Information Hiding, 1999.
35. J. Lach, W. H. Mangione-Smith, and M. Potkonjak, "Runtime Logic and Interconnect Fault Recovery on Diverse FPGA Architectures," presented at Military and Aerospace Applications of Programmable Devices and Technologies, 1999.
36. Benyamin and W. Mangione-Smith, "Functional Unit Specialization through Code Analysis," presented at International Conference on Computer Aided Design, 1999.
37. J. Kin, C. Lee, W. H. Mangione-Smith, and M. Potkonjak, "A Technique for QoS-Based System Partitioning," presented at ASP-DAC, 2000.
38. S. Brown, C. Lee, and W. H. Mangione-Smith, "Offline Program Re-Mapping to Improve Branch Prediction Efficiency in Embedded Systems," presented at ASP-DAC, 2000.
39. H. Kim and W. Mangione-Smith, "Factoring Large Numbers with Programmable Hardware," presented at International Symposium on Field Programmable Gate Arrays, 2000.
40. G. Memik, W. Hu, and W. Mangione-Smith, "NetBench: A Benchmarking Suite for Network Processor," presented at Computer Aided Design, 2001.
41. G. Memik, S. Memik, and W. Mangione-Smith, "Design and Analysis of a Layer Seven Network Processor Accelerator Using Reconfigurable Logic," presented at IEEE Symposium on FPGAs for Custom Computing Machines, 2002.
42. G. Memik and W. Mangione-Smith, "A Flexible Accelerator for Layer 7 Networking Applications," presented at Design Automation Conference, 2002.
43. Y. Cho, S. Navab, and W. Mangione-Smith, "Specialized Hardware for Deep Network Packet Filtering," presented at International Conference on Field Programmable Logic and Application, 2002.
44. G. Memik and W. Mangione-Smith, "Improving Power Efficiency of Multi-Core Network Processors Through Data Filtering," presented at International Conference on Compilers, Architecture and Synthesis for Embedded Systems, 2002.
45. G. Memik, G. Reinman, and W. Mangione-Smith, "Just Say No: Benefits of Early Cache Miss Determination," presented at International Symposium on High Performance Computer Architecture, 2002.
46. G. Memik and W. Mangione-Smith, "NEPAL: A Framework for Efficiently Structuring Applications for Network Processors," presented at NP-2: The Second Workshop on Network Processors, Anaheim, CA, 2003.
47. G. Memik, G. Reinman, and W. H. Mangione-Smith, "Reducing Energy and Delay Using Efficient Victim Caches," presented at International Symposium on Low Power Electronics and Design, Seoul, Korea, 2003.

48. Young Cho and William H. Mangione-Smith, "Programmable Hardware for Deep Packet Filtering on a Large Signature Set." First Watson Conference on Interaction between Architecture, Circuits, and Compilers (P=ac 2 ), Yorktown, NY, Oct. 6-8, 2004
49. Young Cho and William H. Mangione-Smith, "Deep Packet Filter with Dedicated Logic and Read-Only-Memories." IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM), Napa Valley / CA, April 2004.

#### **Book Chapters**

1. W. H. Mangione-Smith, "Register Requirements for High Performance Code Scheduling," in *The Interaction of Compiler Technology and Computer Architecture*, D. Lilja and P. Bird, Eds.: Kluwer Academic Press, 1994, pp. 51-84.
2. W. H. Mangione-Smith, "Performance Bounds for Rapid Computer System Evaluation," in *Fast Simulation of Computer Architectures*, T. Conte and C. Gimarc, Eds.: Kluwer Academic Press, 1995.
3. G. Memik and W. H. Mangione-Smith, "NEPAL: A Framework for Efficiently Structuring Applications for Network Processors," in *Network Processor Design: Issues and Practices*, vol. 2, P. Crowley, M. A. Franklin, H. Hadimioglu, and P. Z. Onufryk, Eds.: Morgan Kaufman, 2003.

#### **Magazine Articles**

1. W. H. Mangione-Smith, S. G. Abraham, and E. S. Davidson, "A Performance Comparison of the IBM RS/6000 and the Astronautics ZS-1," in *IEEE Computer*, vol. 24, 1991.
2. W. H. Mangione-Smith, B. Hutchings, D. Andrews, A. DeHon, C. Ebeling, R. Hartenstein, O. Mencer, J. Morris, K. Palem, V. K. Prasanna, and H. A. E. Spaanenburg, "Seeking Solutions in Configurable Computing," in *IEEE Computer*, vol. 30, 1997, pp. 38-43.
3. W. H. Mangione-Smith, "Application Design for Configurable Computing," in *IEEE Computer*, vol. 30, 1997, pp. 115-17.
4. J. Villasenor and W. H. Mangione-Smith, "Configurable Computing," in *Scientific American*, vol. 276, 1997, pp. 54-9.
5. W. H. Mangione-Smith, "Mobile Computing and Smart Spaces," in *IEEE Concurrency*, vol. 6, 1998, pp. 5-7.
6. W. H. Mangione-Smith, "Beauty Depends on Size'-Aristotle," in *IEEE Concurrency*, vol. 6, 1998, pp. 8-10.